Math 324 - Additional Problems HW#7

1. In $\mathbb{R}^2$ calculate and graph span(X) for each of the following X sets:
   (a) $X = \left\{ \begin{bmatrix} 0 \\ 0 \end{bmatrix} \right\}$
   (b) $X = \left\{ \begin{bmatrix} 3 \\ 1 \end{bmatrix} \right\}$
   (c) $X = \left\{ \begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ 3 \end{bmatrix} \right\}$
   (d) $X = \left\{ \begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ 2 \end{bmatrix} \right\}$
   (e) $X = \left\{ \begin{bmatrix} 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 2 \\ 3 \end{bmatrix} \right\}$
2. In $\mathbb{R}^3$ calculate and graph span $\left(\left\{ \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} \right\} \right)$.
3. In $\mathbb{R}[x]$:
   (a) Calculate span $(\{1, x, x^2\})$. Do you recognize this subspace?
   (b) Calculate span $(\{1, x^2, x^4\})$.
4. In M_{22}:
   (a) Calculate $W = \text{span}\left(\left\{ \begin{bmatrix} 2 & 0 \\ 0 & 0 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 0 & -1 \end{bmatrix} \right\} \right)$.
   (b) Show that $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix} \in W$.
5. In $F(-\infty, \infty)$ calculate span $(\{e^x, e^{2x}\})$.